REPORT OF SURVEY

HAPPY CAMP LAVA-BED PROJECT

MODOC NATIONAL FOREST, CALIFORNIA

November 1924.

In order to obtain information on the progress of the pine beetle infestation in the western yellow pine of this area, a check cruise was made by a three man survey crew of the Bureau of Entomology from October 18th to November 6th, 1924. The check sections cruised and marked last year were recruised and all trees killed during the 1923 season, numbered and mapped and counts made on those killed during 1924 which were visible at the time. The cost of this work was approximately $400 and was borne entirely by the Bureau of Entomology.

The 1923 loss over the entire area showed a very marked reduction from that of 1922, averaging about 54%. This reduction was greatest on the epidemic areas. The endemic areas showed very little change.

However, it was apparent that the 1924 loss, following the past dry year, was going to be quite heavy. The survey indicated an 81 % increase over the 1923 loss, which will very nearly put the loss back to where it was in 1922.

The fluctuations in the various units corresponded to that of the entire area, indicating that the factors which have operated to cause the decrease and increase of infestation have been operative thruout.

The results of the cruise on the various units is as follows:

1. Glass Mt. Unit.

This was a heavily infested unit in 1921 and 1922, but declined to an endemic state in 1923. The 1924 loss has increased very materially over that of 1923. However, most of the trees are infested with flathead beetles and with very light broods of the western pine beetle, indicating that climatic factors are largely responsible for the increase in the number of dying trees.

Year of Attack	Estimated Loss per check Section	Reduction	Increase
1921	90trees		
1922	79 "	12 %	
1923	36 "	54 %	
1924	93 " (tentative)		158 %

2. Timber Mt. Unit.

No check sections were located in this unit. It was endemic last year and continues to be so.

3. Badger Unit.

The 1922 loss on this unit was termed a moderate balanced epidemic and control was recommended. A natural reduction occurred

in the 1923 loss but the unit did not return to normal. The 1924 loss has again increased but has not become quite as epidemic as in 1922. Few groups are found. The summer killed trees have light broods but the winter broods are fairly heavy.

Year of Attack	Estimated loss per check section	Reduction	Increase
1921	170 trees		
1922	98 "	42 %	
1923	47 "	52 %	
1924 (tentative)	73 "		56 %

4. Lava Unit.

This unit is similiar to the Timber Mt. Unit and has remained endemic with some reduction in the 1923 loss and an increase in the 1924 loss.

5. Happy Camp Unit.

The infestation on this unit was called last year a moderately high epidemic. The 1923 loss was only endemic with an average of 31 trees on the check sections. The 1924 loss shows every indication of being even greater than that of 1922. The trees are in groups and the overwintering broods are very heavy. All of which indicates an epidemic situation.

Year of Attack	Estimated loss per check section	Reduction	Increase
1921	92 trees		
1922	69 "	25 %	
1923	31 "	55 %	
1924 (tentative)	87 "		181 %

6. Pitt River Unit.

Thec check section on this unit is in the middle of the epidemic center of last year. There was a big reduction in the 1923 loss over that of 1922 but the unit did not become endemic. The loss for 1924 will be greater than that for 1923. Some of this loss is occurring in groups and the overwintering broods are fairly heavy in the trees.

Year of Attack	Estimated loss per check section	Reduction	Increase
1921	140 trees		
1922	166 "		18 %
1923	74 "	55 %	
1924 (tentative)	94 "		27 %

7. White Horse Unit.

Last year this infestation was classed as a moderately high epidemic. The 1923 loss declined to a moderate epidemic. The 1924 loss indicates a very high epidemic condition. Numerous groups are found and the broods in the overwintering trees are very heavy.

Year of Attack	Estimated loss per check section	Reduction	Increase
1921	67 trees		
1922	80 "		19 %
1923	58 "	27 %	
1924 (tentative)	111 "		92 %

55

8. Widdow Valley Unit.

This unit was called endemic last year and no control was recommended. The infestation decreased again during 1923 and appeared to be still dropping during 1924. No groups are found and the broods in the overwintering trees are very light .

Year of Attack	Estimated loss per check section	Reduction	Increase.
1921	50 trees		
1922	34 "	32 %	
1923	30 "	13 %	
1924 (tentative)	20 " 21	33 %	

9. Hot Springs Unit.

This unit composed of scattered stands on a southern exposure showed a very high loss during 1921 and 1922. For 1923 a very sudden drop occurred which practically brought the infestation down to an endemic condition. It shows no increase for 1924. No groups of new trees are found and the overwintering broods are fairly strong.

Year of Attack	Estimated loss per check section	Reduction	Increase
1921	133 trees		
1922	120 "	10 %	
1923	34 "	72 %	
1924 (tentative)	29 " 24	15 %	

10. Muck Valley Unit.

Still endemic with some reduction in 1923 and a slight increase in 1924.

TOTAL AREA

Year of Attack	Estimated loss per check section	Reduction	Increase
1921	109 trees		
1922	91 "	17 %	
1923	42 "	54 %	
1924 (tentative)	76 "		81 %

In the report of last year's examination, the following statement was made: "In the heaviest epidemic centers, a natural decline can be expected. The history of all severe epidemic centers has shown that they may be expected to decrease rather suddenly through the effect of natural agencies, but that complete control will not be reached for a number of years without the application of artificial means. "

Such a sudden decline occurred in all of the epidemic centers of this area during 1923, bringing most of the area down to what can be considered as an endemic situation. Last year's survey was made during August and September, at which time only a part of the 1923 attack had occurred, and it was not thought that the data on the 1923 attack were sufficiently complete to base a prediction as to the probable 1923 loss. Therefore, the recommendations which were made were based on the 1922 loss and the previous status of the infestation.

The survey of this year was made in October and November and besides getting an accurate count on the 1923 loss, enough data were secured on the 1924 loss to be a reliable index of the present trend of the infestation. These data show that a very heavy increase is now developing.

A similiar increase in the 1924 attacks has occurred on the Southern Oregon-Northern California project just north of this area. Here it is felt that the control work being carried on this fall will be an important factor in reducing subsequent losses; and that probably the very best time to do artificial control is in the face of an increasing infestation, when the natural control factors are not operative. If this work should fail to bring about the anticipated result, very little can be said in favor of control work.

So far on the S.Ore.-N.Calif. project, very satisfactory reductions have been secured, but recent evidence has raised the question as to what proportion of this reduction can be attributed to natural factors and how much to control work. Until this point has been definitely settled, the Bureau does not wish to recommend the starting of any new large-scale projects.

The following tables give the loss data on this area to date. A map giving the location of the units accompanied last year's report and is not duplicated this year.

Respectfully submitted:

F.P.Keen,
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Palo Alto, Calif.
Dec. 11, 1924.

TABLE I

FIELD SURVEY DATA

UNIT	LOCATION	SURVEY OF 1923			SURVEY OF 1924			
		1921	1922	1923	Remarked 1923	New 1923	Total 1923	1924
1. Glass Mt.	T 42 N R 5 E Sec. 3 N½	19	19	3	2	11	12	13
	T 44 N R 5 E Sec. 36 N½	35	59	8	1	22	24	52
2. Badger	T 43 N R 7 E Sec 22 S½	58	52	12	1	18	29	41
	T 44 N R 8 E Sec 16 W½	44	34	4	0	14	18	10
5. Happy Camp	T 42 N R 7 E Sec 28 W½	21	26	4	2	10	12	30
	T 41 N R 6 E Sec 18 E½	54	33	11	6	14	19	31
6. Pitt River	T 41 N R 8 E Sec 4 N½	42	73	21	21	37	37	33
7. White Horse	T 40 N R 5 E Sec 12 E½	20	35	16	16	29	29	39
8. Widow Valley	T 39 N R 6 E Sec 23 E½	15	15	10	4	9	15	7
9. Hot Springs	T 36 N R 6 E Sec 22 N/2	40	53	4	0	13	17	10
TOTAL CRUISE	3200 acres	328	401	88	53	177	212	266
ESTIMATED LOSS		546	455				212	380
ESTIMATED LOSS PER SECTION		109	91				42	76
REDUCTION OR INCREASE		- 17 %			- 54 %			+ 81 %

TABLE

VOLUME OF TIMBER KILLED BY BEETLES.

UNIT	1921 Loss Bd. ft.	1922 Loss Bd. ft.	1923 Loss Bd. ft.	1924 * Loss Bd. ft.
1. Glass Mt.	9,480,000	8,330,000	3,830,000	9,800,000
2. Timber Mt.	1,300,000	1,291,500	1,000,000	1,200,000
3. Badger	11,140,000	6,421,500	3,080,000	4,780,000
4. Lava	3,000,000	2,610,000	1,800,000	2,000,000
5. Happy Camp	9,420,000	7,067,500	3,180,000	8,900,000
6. Pitt River	3,040,000	3,604,500	1,620,000	2,060,000
7. White Horse	2,650,000	3,162,000	2,300,000	4,400,000
8. Widow Valley	2,560,000	1,745,000	1,540,000	1,030,000
9. Hot Springs	2,400,000	2,169,000	610,000	520,000
10. Muck Valley	1,000,000	980,000	800,000	900,000
TOTAL	45,990,000	37,381,000	19,760,000	35,590,000
Percent of Stand	.92%	.75 %	.40 %	.71 %

* The 1924 loss is a tentative figure until the results of the survey of 1925 is available.